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On a reported Occultation of *Regulus* by the planet *Venus*, A.D. 885, September 9. By J. R. Hind, Esq.

In the manuscript of the work of the Arabian astronomer Ibn-Jounis, described by Delambre, *Astronomie du moyen Age*, p. 76, *Regulus* is said to have been occulted by *Venus*, on a date which corresponds to A.D. 885, September 9, in the Julian Calendar. The observation is thus given at p. 87: "Occultation de *Régulus* par *Vénus*, le 9 Septembre 885. Une heure avant le lever du Soleil, chacun des deux jours précédens, le mouvement de *Vénus* avait été de plus de 1°."

I have examined this observation by means of M. Le Verrier's Tables of the Sun and Planets, and with the following results. I give my numbers in sufficient detail to admit of verification by any one curious enough to repeat the work:—

A. D. 885.	Paris M. T. d h	☿ Helioc. long. " "	☿ Helioc. lat. " "	☿ Rad. Vect.	☼ True long. " "	☼ Log. Rad. Vect.
Sept.	9 12	77 12 7	+0 37 32	0.7191606	351 23 14	0.0002061
"	10 0	78 0 40	0 40 21	0.7191138	351 52 47	0.0001429
"	10 12	78 49 12	+0 43 8	0.7190670	352 22 20	0.0000795

Hence the geocentric places of *Venus* are :

	d h	True R. A. ° ' "	True Decl. ° ' "	Log. Distance.
Sept.	9 12	136 53 30	+17 0 35	0.07509
"	10 0	137 29 39	16 51 41	0.07626
"	10 12	138 5 45	+16 42 38	0.07741

Aberration in R.A.	. . .	-29.7	Diameter of <i>Venus</i>	. . .	14.0
" in Decl.	. . .	+ 7.4	Horizontal Parallax of <i>Venus</i>		7.5

I take the position of *Regulus* from the last Greenwich Catalogue (1864), and its proper motions from M. Le Verrier's *Annales*, II. p. 198, and by the rigorous trigonometrical formulæ thus find for the beginning of A.D. 885 :

$$\text{Regulus Mean R. A. . } 136^{\circ} 59' 3.7'' \quad \text{Mean } \delta + 17^{\circ} 0' 58.0''$$

The reduction constants after Bessel for the date are :

$$\log. A + 1.2672 \quad \log. B - 0.4860 \quad \log. C + 9.5634 \quad \log. D - 0.4312$$

and, therefore, the corrections for apparent place of star :

$$\text{R. A. } + 2.6'' \quad \text{Decl. } + 1.2''$$

I assume the observation to have been made at Baghdad ; and from the above numbers find the conjunction in Right Ascension would take place on September 9, at 16<sup>h</sup> 50<sup>m</sup> mean time, the planet being then 1' 47" south of the star—both geocentric. The nearest approach would occur about 16<sup>h</sup> 43<sup>m</sup>, at which time the distance may be taken 1'·7. The Sun rose at Baghdad at 17<sup>h</sup> 42<sup>m</sup>; and the hour before sunrise, when it would appear the observation was made, therefore corresponds to the time found for nearest approach.

At a distance of 1'·7 it may perhaps be granted that the star would be lost to the naked eye in the comparative blaze of the planet, and thus M. Le Verrier's Tables sufficiently represent the place of *Venus* one thousand years ago. It will be remarked, that this near approach took place when the planet was in nearly the same part of its orbit that it will occupy during the approaching transit.

As an addendum to the above, I give the results of my examination of another interesting observation recorded by the same Arabian astronomer (Delambre, *Astr. du moyen Age*, p. 80) : "Conjonction de ♂ et ♀, 13 Février 864. ♀ et ♂ paraissaient à la vue se toucher au commencement de la nuit." I again make use of M. Le Verrier's Tables of the Sun and Planets, and find :

A. D. 864.	Paris M. T. d h	☉ True long. ° ' "	☉ Log. Rad. Vect.	
Feb.	13 0	148 43 32·9	9·9967588	
"	13 6	148 58 33·2	9·9967883	
		♀ Helioc. long. ° ' "	♀ Helioc. lat. ° ' "	♀ Log. Rad. Vect.
Feb.	13 0	52 44 21·2	—0 47 49·9	9·8578530
"	13 6	53 8 30·8	—0 46 26·6	9·8578329
		♂ Helioc. long. ° ' "	♂ Helioc. lat. ° ' "	♂ Log. Rad. Vect.
Feb.	13 0	24 50 5·3	—0 30 25·3	0·1654763
"	13 6	24 58 35·3	—0 30 9·0	0·1655668

And hence the geocentric places :

		♀ Long. ° ' "	♀ Lat. ° ' "	♂ Long. ° ' "	♂ Lat. ° ' "
Feb.	13 0	2 36 9	—0 26 49	2 37 1	—0 20 26
"	13 6	2 54 17	—0 26 4	2 48 6	—0 20 15

The conjunction in Longitude would therefore occur February 13<sup>d</sup> 3<sup>h</sup> 32<sup>m</sup> mean time at Baghdad, when *Mars* would be north of *Venus* 6'·3, which is a degree of approximation not inaptly represented by the words of the Arabian astronomer, as regards naked-eye observation.